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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/539,551	06/16/2005	Gi-Bong Kwon	0630-2357PUS1	2666
2292 7590 09/20/2007 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			EXAMINER LEY, FRANCISCO M	
			ART UNIT 3746	PAPER NUMBER
			NOTIFICATION DATE 09/20/2007	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

**Office Action Summary**

Application No.

10/539,551

Applicant(s)

KWON, GI-BONG

Examiner

Francisco M. Ley

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 June 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>8/03/2007 and 6/16/2005</u> .                                 | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Specification*

1. The disclosure is objected to because of the following informalities:

Page 1, Lines 12-13: "researches on a substitute refrigerant are being actively conducted" should probably recite, "**research** on a substitute refrigerant **is** being actively conducted."

Page 1, Line 20: "and in case of R23" should probably recite, "and in **the** case of R23".

Page 2, Line 2: "refrigerant among halocarbon" should probably recite, "refrigerant among halocarbons".

Page 5, Line 2: "a mover disposed spaced apart"

Page 6, Lines 11-12: "has a zero ODP and incombustible" should probably recite, "has a zero ODP and **is** incombustible."

Appropriate correction is required.

### *Claim Objections*

2. Claims 1 and 5 are objected to because of the following informalities:

Claim 1 at Line 7 recites, "mover disposed spaced apart" which should probably be, "mover disposed apart" or "mover spaced apart".

Claim 5 recites, "refrigerant has a zero ODP and incombustible" which should probably recite, "refrigerant has a zero ODP and **is** incombustible."

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 10, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention.

See MPEP § 2173.05(d).

***Double Patenting***

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

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6. Claims 1-2, and 5-9 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 6-10 of copending Application No. 10/539304. Although the conflicting claims are not identical, they are not patentably distinct from each other.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

The following table outlines the conflicting claims between the current application and copending application 10/539304:

<p><b><u>Current Application (10/539551) –</u></b></p> <p>Reciprocating Compressor for Refrigerant</p>	<p><b><u>Copending Application* (10539304) –</u></b></p> <p>Refrigerating System Having Reciprocating Compressor</p> <p>*(Some claims are not repeated entirely. For these cases only the pertinent sections have been extracted and are shown in quotes)</p>
<p><u>Claim 1:</u> A reciprocating compressor for a refrigerator comprising:</p> <ul style="list-style-type: none"> <li>• a hermetic container having a suction pipe and a discharge pipe connected thereto;</li> <li>• a driving unit having a stator fixed inside the hermetic container and a mover disposed spaced apart from the stator and linearly and reciprocally moved by interaction with the stator;</li> <li>• an HFC refrigerant sucked into the suction pipe, being hydrogenated carbon fluoride and not including chlorine</li> <li>• a compressing unit for compressing the HFC refrigerant upon receiving a reciprocal motional force generated</li> </ul>	<p><u>Claim 1:</u> A refrigerating system of a reciprocating compressor comprising:</p> <ul style="list-style-type: none"> <li>• "a reciprocating compressor which includes a driving unit having a stator consisting of an outer stator fixed inside a hermetic container"</li> <li>• "a mover consisting of magnets disposed at regular intervals between the outer stator and the inner stator and linearly and reciprocally moved"</li> <li>• "an HFC refrigerant, hydrogenated carbon fluoride comprising hydrogen, fluorine and carbon and not including chlorine"</li> <li>• "a compression unit for performing a compressing operation on a</li> </ul>

<p>from the driving unit</p> <ul style="list-style-type: none"> <li>• a ester-based lubricant, a sort of synthetic fluid, filled at the lower portion of the hermetic container and having a high moisture absorption and a saturated water amount of 1500-2000 PPM</li> <li>• a lubrication unit for supplying the ester-based lubricant to each motional portions of the driving unit and the compression unit and making a lubricating operation</li> </ul>	<p>refrigerant upon receiving the linear reciprocal motional force of the driving unit"</p> <ul style="list-style-type: none"> <li>• "an ester-based lubricant, a sort of synthetic fluid, with a high moisture absorption and a saturated water amount of 1500-2000 PPM"</li> <li>• "a lubrication unit for supplying the lubricant, a sort of a mineral oil, to each motional portion of the driving unit and the compression unit and performing a lubrication operation"</li> </ul>
<p><u>Claim 2:</u> The reciprocating compressor of claim 1, wherein:</p> <ul style="list-style-type: none"> <li>• the stator consists of an outer stator fixed at the hermetic container;</li> <li>• an inner stator disposed with a certain air gap with an inner circumferential surface of the outer stator; and</li> <li>• a winding coil would at one of the outer stator and the inner stator, to which power is applied from an external source, and</li> <li>• the mover consists of a magnet disposed between the outer stator and the inner stator and being linearly and reciprocally moved when power is applied to the winding coil;</li> <li>• a magnet frame having magnets mounted thereon</li> <li>• and a piston connected to the magnet frame and compressing a fluid while being linearly and reciprocally moved.</li> </ul>	<p><u>Claim 1:</u></p> <ul style="list-style-type: none"> <li>• "a driving unit having a stator consisting of an outer stator fixed inside a hermetic container"</li> <li>• "an inner stator disposed with a certain air gap with an inner circumferential surface of the outer stator"</li> <li>• "a winding coil wound at one of the outer stator and the inner stator, to which power is applied from an external source"</li> <li>• "a mover consisting of magnets disposed at regular intervals between the outer stator and the inner stator and linearly and reciprocally moved when power is applied to the winding coil"</li> <li>• "a magnet frame, in which the magnets are mounted"</li> <li>• "a compression unit for performing a compressing operation on a refrigerant"</li> </ul>
<p><u>Claim 5:</u></p> <ul style="list-style-type: none"> <li>• The reciprocating compressor of claim 1, wherein the refrigerant has a zero ODP (ozone depletion</li> </ul>	<p><u>Claim 6:</u></p> <ul style="list-style-type: none"> <li>• The refrigerating system of claim 1, wherein the refrigerant has a zero ODP (ozone depletion potential)</li> </ul>

potential) and incombustible.	and is incombustible.
<u>Claim 6:</u> <ul style="list-style-type: none"> <li>The reciprocating compressor of claim 1, wherein HFC134a with a purity of above 99.9%, a molecular formula of <math>\text{CF}_3\text{CFH}_2</math> and a molecular weight of 102 is used as the refrigerant.</li> </ul>	<u>Claim 7:</u> <ul style="list-style-type: none"> <li>The refrigerating system of claim 1 wherein the refrigerant is HFC134a which has a purity of above 99.9%, a molecular formula of <math>\text{CF}_3\text{CFH}_2</math> and a molecular weight of 102.</li> </ul>
<u>Claim 7:</u> <ul style="list-style-type: none"> <li>The reciprocating compressor of claim 1, wherein the lubricant has a density of <math>0.93\sim 0.990 \text{ g/cm}^3</math> at a temperature of <math>15^\circ\text{C}</math> and a total acid number of below 0.01 mgKOH/g.</li> </ul>	<u>Claim 8:</u> <ul style="list-style-type: none"> <li>The refrigerating system of claim 1, wherein the lubricant has a density of <math>0.93\sim 0.990 \text{ g/cm}^3</math> at a temperature of <math>15^\circ\text{C}</math> and a total acid number of below 0.01 mgKOH/g.</li> </ul>
<u>Claim 8:</u> <ul style="list-style-type: none"> <li>The reciprocating compressor of claim 1, wherein the lubricant has a flash point of below <math>240^\circ\text{C}</math> and a kinematic viscosity of <math>10.0\sim 22.5 \text{ mm}^2/\text{s}</math> at a temperature of <math>40^\circ\text{C}</math>.</li> </ul>	<u>Claim 9:</u> <ul style="list-style-type: none"> <li>The refrigerating system of claim 1, wherein the lubricant has a flash point of below <math>240^\circ\text{C}</math> and a kinematic viscosity (cSt) of <math>10.0\sim 22.5 \text{ mm}^2/\text{s}</math> at a temperature of <math>40^\circ\text{C}</math>.</li> </ul>
<u>Claim 9:</u> <ul style="list-style-type: none"> <li>The reciprocating compressor of claim 1, wherein the lubricant contains additives such as a stabilizer, an antioxidant and the like.</li> </ul>	<u>Claim 10:</u> <ul style="list-style-type: none"> <li>The reciprocating compressor of claim 1, wherein the lubricant contains an additive such as a stabilizer or antioxidant, etc.</li> </ul>

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song et al. (U.S. Patent 6,435,842; Hereinafter, Song) in view of Honma (U.S. Patent

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5,531,574) and further in view of Konishi et al. (U.S. Patent 5,732,568; Hereinafter, Konishi).

Regarding claims 1, 2, 3, 4 and 5 Song discloses a hermetic container V to which a suction pipe SP and a discharge pipe DP are connected. A driving unit has a stator 4B fixed inside the hermetic container and a mover 5 disposed apart from the stator and linearly and reciprocally moved according to an interaction with the stator (Column 1, Lines 32-35). Stator 4B is fixed at the hermetic container (Column 1, Line 29) and an inner stator 4A is disposed with a certain air gap (Column 1, Lines 30-31) with an inner circumferential surface of the outer stator. A winding coil to which power is applied from an external source is wound at the outer stator 4B and is shown by an "X" in Figure 1. The mover 5 comprises magnets disposed at regular intervals between the outer stator and the inner stator and being linearly and reciprocally moved when power is applied to the winding coil (Column 1, Lines 33-35). The mover 5 further serves as a magnet frame having magnets mounted on it and transmitting a linear and reciprocal motional force to the compression unit (Column 1, Lines 33-35).

The compression unit disclosed by Song includes a piston 6 connected to the mover 5 and linearly and reciprocally moved (Column 1, Lines 33-35), as well as a cylinder 3 into which the piston 6 is slidably inserted, for forming a compression chamber. Also included are a suction valve 8 (Column 1, Line 58) mounted at a refrigerant passage formed at the piston and preventing a backflow of the refrigerant after being introduced into the compression chamber as is well known in the art, as well as a discharge valve 9a (Column 1, Line 59) mounted at the front side of the cylinder



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and performing an opening and closing operation on the compressed refrigerant, as is also well known.

A lubrication unit O is shown in Figure 1 having a lubricant pumping unit for pumping oil at a lower portion of the hermetic container, and a lubricant supply passage for supplying the lubricant pumped by the lubricant pumping unit to a frictional portion between the piston and cylinder (Column 1, Lines 18-20).

Song discloses all the claimed limitations, as is stated above, except for the use of an HFC refrigerant and an ester-based lubricant. However, Honma teaches the use of an HFC refrigerant, being hydrogenated carbon fluoride and not containing chlorine, and a lubricant that is an ester-based lubricant, a sort of synthetic fluid in a refrigeration unit (Column 2, Lines 28-34). Honma discloses that the refrigerant has a zero ozone depletion potential (Column 2, Lines 32-33) but does not disclose that it is incombustible. However, it would be obvious to make the refrigerant incombustible for use in a reciprocating compressor, as this would avoid potential fire hazards. Konishi teaches the use of ester oil having a water content of 1500 ppm (Column 1, Lines 47-50). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Song to use an HFC refrigerant such as that disclosed by Honma. This would provide a refrigerant that does not cause damage to the ozone layer (See Honma, Column 1, Lines 41-44). Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Song to use an ester-based lubricant having a saturated water content of 1500~2000 ppm as disclosed

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by Konishi. By providing a small water content in the oil, this prevents the production of sludge in a refrigerating cycle (Konishi Column 1, Lines 64-65).

9. Claims 6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claim 1 above, and further in view of Hirano et al. (U.S. Patent 5,704,216; Hereinafter, Hirano).

10. Song in view of Honma and Konishi as applied to claim 1 above discloses all the limitations as claimed except that neither Song, Honma, or Konishi disclose that the purity of the refrigerant is above 99.9% or that the lubricant contains additives.

However, Hirano discloses the use of R134A having a purity of 99.95 % (See abstract of Hirano), which inherently has a molecular formula of  $\text{CF}_3\text{CFH}_2$  as well as molecular weight of 102. Furthermore, Hirano discloses that an additive may be included in the lubricant such as an extreme pressure stabilizer (Column 3, Lines 41-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Song to use R134a with a purity of above 99.9% and a lubricant containing additives as disclosed by Hirano. These characteristics would aid in improving the "performance and reliability of a refrigerating unit" (See Hirano abstract discussing purity and Column 2, Lines 11-15 discussing additives).

11. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claim 1 above, and further in view of Hirona (U.S. Patent 5,704,216) and Mobile EAL Arctic Series 32

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([http://web.archive.org/web/20051111102058/http://www.mobil.com/USA-English/Lubes/PDS/GLXXENINDMOMobil\\_EAL\\_Arctic.asp](http://web.archive.org/web/20051111102058/http://www.mobil.com/USA-English/Lubes/PDS/GLXXENINDMOMobil_EAL_Arctic.asp)).

Song in view of Honma and Konishi as applied to claim 1 above discloses all the limitations as claimed except that neither Song, Honma, or Konishi disclose a density of the lubricant between  $0.93\sim 0.99\text{ g/cm}^3$  and an acid number of below  $0.01\text{ mgKOH/g}$ . However, Hirona discloses a lubricant 18 having a total acid volume lower than  $0.01\text{ mgKOH/g}$  (Column 11, Lines 58-63) and Mobile EAL Arctic Series 32 is a lubricant with a density of  $.98\text{ g/cm}^3$  (Calculated from the specific gravity of .98 at  $15^\circ\text{C}$ , which equals the ratio of the density of the oil to the density of water ( $1\text{ g/cm}^3$  or  $1\text{ kg/l}$ ), and therefore the density of the oil is  $.98 * 1\text{ g/cm}^3$  which equals  $.98\text{ g/cm}^3$ ).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Song to include a lubricant having a density between  $0.93\sim 0.99\text{ g/cm}^3$  similarly to Mobil EAL Arctic Series 32 and an acid number below  $0.01\text{ mgKOH/g}$  as disclosed by Hirona. The property of a low acidity would prevent metallic soaps from forming that have an adverse effect on a refrigeration cycle (See Hirona, Column 1, Lines 44-49) and the properties of Mobile EAL Arctic series 32 such as density allow it to have good anti-wear properties and high efficiency in refrigeration system designs (See table on Mobile webpage regarding Features and Advantages).

12. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claim 1 above, and further in view of Chevron 100R

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([http://web.archive.org/web/20010217041255/www.chevron.com/prodserv/BaseOils/neutral\\_prop.htm](http://web.archive.org/web/20010217041255/www.chevron.com/prodserv/BaseOils/neutral_prop.htm)).

Song in view of Honma and Konishi as applied to claim 1 above discloses all the limitations as claimed except that neither Song, Honma, or Konishi specify a flash point below 240°C and a kinematic viscosity of 10.0~22.5 mm<sup>2</sup>/s for the oil used in the compressor. However, as disclosed on the webpage, Chevron 100R has a flash point of 213°C and a kinematic viscosity at 40°C of 19.7 cSt (1 cSt = 1 mm<sup>2</sup>/s).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use an oil in Song such as Chevron 100R. As is disclosed in the description webpage

(<http://web.archive.org/web/20010217040328/www.chevron.com/prodserv/BaseOils/neutral.htm>), Chevron 100R provides "superior cold-flow performance" which would make it desirable for a compressor such as that disclosed by Song that is used in a low temperature refrigeration application. Note: The URL of the web pages from the Internet Archive indicates that the websites date from February 17<sup>th</sup>, 2001, which is more than one year prior to the effective date of the present application.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Francisco M. Ley whose telephone number is (571) 270-1299. The examiner can normally be reached on Monday-Friday, 8:30am-6:00pm, Alt Fridays, EST.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Stashick can be reached at (571) 272-4561. The fax phone

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number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at (866) 217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call (800) 786-9199 (IN USA OR CANADA) or (571) 272-1000.

/FML/  
September 15, 2007

  
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